

EDUCATION/EXPERIENCE

- **Imagine Lab, ENPC (part of IP Paris)** Champs sur Marne, France
Research Engineer *June. 2024 – April 2025*
- **CRDIG, Université Laval** Québec, Canada
Summer Research Intern *May. 2023 – August 2023*
- **Indian Institute of Science Education and Research** Bhopal, India
BS-MS (Integrated); CPI: 8.16/10 *Aug. 2019 – May 2024*
- **Doon International School** Dehradun, India
AISSCE; CGPA: 9.7/10 *April. 2018 – May. 2019*

INTERNSHIPS/ACADEMIC PROJECTS

- **CoDEX: Combining Domain Expertise for Spatial Generalization.** Mathieu Aubry, Loic Landrieu
Multi-expert model training for SITS with a domain generalization network. *2024-2025*
 - **Shared backbone with experts:** Our model uses a shared backbone to extract common semantic features and a lightweight specialized expert for each domain.
 - **Multi Domain Training:** Training the model to produce accurate and domain consistent predictions using Domain Loss and Consistency Loss.
 - **Domain Expert Selection:** We train a domain expert selection model to select the most relevant models for a given input sample from an unseen domain.









Published at the CVPR (Earthvision Workshop).
- **Deep Learning-based LiDAR Tree Object Recognition in Boreal Forests.** Eric Guilbert
Detecting individual trees from virtual airborne LiDAR in Boreal Forests of Canada. *2023-2024*
 - **Dataset Creation:** Dataset simulated via Helios++ and tested on real world point cloud forests.
 - **Object Detection:** Applying SOTA architectures like PointPillars, SECOND, PV-RCNN for bounding box based tree extraction.
 - **Experimentation:** Results evaluation on several criteria such as the level of detail of the tree and the vegetation models, the flight characteristics and the density of points of the generated cloud.
 - **Testing different LODs:** Classifying vegetation layers, isolating each tree and recognizing the species of the tree according to the density of points.

Selected for funding by Canadian agencies MITACS GRI 2023 and FRQNT, Quebec, Canada.
- **pGS-CAM: Novel algorithm to generate saliency maps for point clouds.** V. Kumar
First study towards interpretable point cloud semantic segmentation via Gradient Based Localization. *2023-2024*
 - **Gradient based methodology:** Generating saliency maps via tracking gradient flowing through the network.
 - **Detailed Experimentation:** Comprehensive assessment on SemanticKITTI, Paris-Lille3D, DALES datasets and KPConv, RandLANet architectures.
 - **Inferences:** Localization test, prediction complexity and providing inference into network misclassifications.

Published at the ICLR (tiny paper track). Extended version available at [Arxiv](#).
- **pCTFusion: Integrating local attention mechanisms with position loss.** V. Kumar, B. Lohani
A novel DL framework improving performance for point cloud semantic segmentation. *2022-2023*
 - **Fusing representations:** Integrating features learnt by different attention mechanisms (Convolution and Self-attention) to obtain superior representation of the data.
 - **Attention on Loss:** A novel weight mechanism that operates on the loss function and gives special attention to rich-detailed areas in the point cloud.
 - **Effect of layers:** Add and drop experimentation for analyzing the effect of different layers on the prediction for SemanticKITTI dataset.
 - **Superior performance:** Substantial increment in Jaccard Index values for certain classes comparing to other state of the art point based architectures.

Published in the Journal of Computer Science (Springer Nature).

RESEARCH WORK & PUBLICATIONS

1. Kuriyal, Abhishek, Elliot Vincent, Mathieu Aubry, and Loic Landrieu. "CoDEX: Combining Domain Expertise for Spatial Generalization in Satellite Image Analysis." In Proceedings of the Computer Vision and Pattern Recognition Conference, pp. 2194-2203. 2025 →  
2. A. Kuriyal and V. Kumar, "pGS-CAM: Interpretable lidar point cloud semantic segmentation via gradient based localization," in The First Tiny Papers Track at ICLR 2023, Tiny Papers @ ICLR 2023, Kigali, Rwanda, May 5, 2023, K. Maughan, R. Liu, and T. F. Burns, Eds. OpenReview.net, 2023 →  
3. Kuriyal, Abhishek, Vaibhav Kumar, and Bharat Lohani. "pCTFusion: Point Convolution-Transformer Fusion with Semantic Aware Loss for Outdoor LiDAR Point Cloud Segmentation." *SN Computer Science* 5, no. 3 (2024): 272. →  
4. Kuriyal, Abhishek, and Vaibhav Kumar. "Towards Explainable LiDAR Point Cloud Semantic Segmentation via Gradient Based Target Localization." arXiv preprint arXiv:2402.12098 (2024). → 
5. Individual Tree Extraction in Airborne LiDAR Point Clouds of Boreal Forest Environments (Master Thesis Report) → 

RELEVANT COURSEWORK

- **Credited:** Intelligent Robotics, Deep Learning, Spatial Data Science and Applications, Natural Language Processing, Discrete Mathematics, Fundamentals of Database Management, Data Structures and Algorithms, Multivariable Calculus, Signals and Systems, Probability and Statistics, Linear Algebra and its Applications, Real Analysis, , Quantum Physics, Classical Mechanics, Applied Optimization, Advanced Programming in Python, Artificial Intelligence, Advanced Econometrics, Machine Learning, Computer Vision, Reinforcement Learning, Differential Equations
- **Master Thesis:** A grade

SKILLS

- **Technical:** LiDAR Point Cloud Processing, 3D Computer Vision, Geospatial Data Analysis, Data Wrangling and Scraping, Digital Image Processing, CUDA Programming, 3D Game Development, Linux system administration
- **Programming Languages:** : Python, C/C++, Javascript, SQL, GDScript
- **Softwares:** : Blender, Godot, QGIS, WeBots, ROS
- **Communication and Leadership:** : Verbal and written fluency in English, Hindi (National)

AWARDS & FELLOWSHIPS

- **MITACS GRI:** Awarded MITACS GRI fellowship (2023) for internship in Canada among students participating over 17 countries globally.
- **TiHAN IIT-H Startup:** Selected for initial startup funding of 7200 USD by TiHAN IIT-Hyderabad for a project related to Conditional LiDAR generation.
- **Academic Poster Presentation:** Awarded best academic poster presentation on National Engineer's Day (15 September 2022), India held at IISERB campus.

VOLUNTEERING EXPERIENCE

- **Climate Fresk:** Participated at annual Climate Fresk, conducted at Imagine@ENPC, IP Paris.
- **Imagine 2024 Hackathon:** Conducted a pan-lab annual Hackathon event, 2024 at Imagine@ENPC, IP Paris.
- **Prayaas:** Teaching and providing exposure to various village government middle and high school students, Bhopal, India.
- **Walkathon:** Tuberculosis awareness and census in selected Bhopal, India villages, an initiative of United Nations (UN).

EXTRA-CURRICULARS

Apart from my love for spatial intelligence, you will find me hiking and playing guitar and ukulele (experimented with youtube). I love reading electronics, philosophy, cooking and have a weird obsession with skydiving too (my Québec experience).